PRELIM.

MONSANTO

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Date: September 11, 1985

Subj: Groundwater Disposal Cost

Re: CEA 3808
Main South Trunk Sewer

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This memo addresses the problem of additional costs incurred starting next May 1, 1986 when the new Regional Treatment Plant revises its sewer treatment costs. This is a prime concern for the new Main South Trunk Sewer project due to the large quantities of water sent to the treatment plant from the dewatering wells.

Steps have been taken to minimize the flow of water that is currently being sent to the existing treatment plant. They are as follows:

1. The ground water level is monitored daily.

2. Based on the current ground water level results (determined in #1), we can determine how many dewatering pumps need to be run. Presently, we are only running 2 pumps.

3. In addition, the discharge piping system on the dewatering pumps was designed with a valve so that the flow from any individual pump could be throttled down to a lower discharge rate. This allows us to run 4 or 5 pumps at a reduced rate so that a large portion of the trench can be dewatered while minimizing the water sent to the treatment plant.

4. The dewatering pumps are also furnished with automatic controls. The pumps only run when a high water level switch is triggered and shut off at low level. Thus, if we only have 2 pumps running, these pumps will not run when low water levels are present.

5. Plans are in progress to possibly install instrumentation to measure the actual CPM flow from these pumps.

The treatment plant charges which will be incurred next year can only be roughly estimated since the weather and ground water level cannot be predicted.

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While a range of costs could be anticipated, the probable minimum cost could be as follows.

- 2 pumps running 2/3 of the time
- Maximum discharge rate from each pump is 1100 gpm.
- Running for a 5 month period
- Estimated sewer treatment cost increase of $1.87/1000 gallons

Cost would be approximately $600K.

The cost could, of course, be higher based on a variety of variables:

- Number of pumps operating
- Percent of time pumps operate
- Rate of flow of pumps
- Number of days of operation
- Weather and ground water levels during the work period
- Actual cost charged by the treatment plant

A number of items either have been done or are being reviewed which will effectively minimize the amount of ground water pumped to the treatment plant next year after May 1.

1. Foundations near dept. 245 are currently being removed to avoid delays when trench excavation reaches this area.

2. Soil borings have been taken to the end of the sewer path to try to locate any contaminated areas. If found, these areas could be cleaned up ahead of time, thus avoiding sewer installation delays.

3. A culvert pipe is being installed under track 4 at dept. 245. This keeps the track open while avoiding sewer installation delays.

4. The possibility of pumping the dewatering pump discharge back into wells no longer being used is being reviewed.

5. Costs have been obtained for bringing additional piling on site to prevent delays. This may not be necessary.

6. A way to reduce the completion work on this sewer would be to relax specifications. This option has not been viable to date.

7. Temporary trench crossings are planned across the trenches at dept. 245. This allows the sewer work to continue while also allowing fork truck movement across the trenches.

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Other construction options are being reviewed that would reduce the completion of this project and minimize water treatment costs.

1. Selective spot overtime can pay dividends to keep the project moving.

2. Four 10-hour days could be worked. This does not result in additional costs, but gives you Friday as a make-up day in case it rains, etc.

3. A structured overtime program can be initiated. The craftsmen could work six 8-hour days or five 10-hour days. This system is usually not as efficient as the standard five 8-hour days, but would serve to increase the schedule.

   Cost would be approximately $10K/month. Probably save 3-4 days a month.

4. Another method would be four 10-hour days with rolling crews. There would be two crews; each crew would work four days and then be off for four days. This would allow installation work to proceed seven days a week.

   This system will require a more in-depth study by the contractor. Some blue sky estimating would suggest that this method could cost $150-200K for a four month period.

   Due to inefficiencies, we could perhaps expect to decrease the schedule by up to three months.

   There are a number of questions which would need to be addressed with this method, such as quality, getting agreement with the craftsmen to do this, etc.

Additional information will be furnished as it becomes available.

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